Research Report

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Pesticide spraying of cattle partially controls stable flies.

Pesky Flies Inflict Serious Losses on Cattle Industry

Researchers investigate biological control

If one wants to look at animal health and welfare from an obvious and realistic vantage, consider the case of cattle and their nemesis: stable flies. The stable fly is a bloodsucking pest of cattle. It inflicts very painful bites on the cattle, subjecting them to a very high degree of stress. This results in a loss of meat quality. Economic losses occur at very low attack rates of one or two flies per foreleg.

The stable fly has become a serious problem in Alberta. "It interferes with the animal's ability to convert feed," says Dr. Tim Lysyk, Research Scientist in Livestock Entomology at the Lethbridge Agriculture and Agri-Food Canada Research Centre. "Along with the energy expended trying to ward off the flies, this adds up to significant weight loss." Based on 1991 figures, the stable fly is responsible for a total loss in Alberta of $5.5 million a year!

Stable flies, which look like horseflies, are very widespread globally and affect many animals, as well as humans. Thus, the Alberta Agricultural Research Institute (ARI) funded a project, under its **Farming for the Future Direct Funding Program**, "Development of Biological Control Methods for Stable Flies in Feedlots" (#920100).

"The stable fly is very aggressive and its bite is painful," continues Dr. Lysyk. "Control has been very difficult." Insecticides are generally ineffective due to the wide distribution of adults and larvae. Strict sanitation is useful up to a point, but is stymied by the widespread fly breeding habits. The basis of the research project was to examine the potential of biological agents - specifically, wasps naturally occurring in Alberta.

Dr. Lysyk continues: "We used four parasitic wasps. They are much smaller than the common garden variety, and, as far as is known, pose no environmental threats, except to the stable fly. One wasp species, *Mucidifurax raptor*, was very effective and consumed the most number of flies. *M. raptorellus* achieved the highest host kill when released in large numbers. It also showed the ability to produce progeny, at half the cost of other *Muscidifurax* species, suggesting it is more economical for rearing and production.

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Alfalfa Alternative

Fenugreek shows diverse potential as a forage crop and a natural source of steroids

Fenugreek is a cloverlike, Eurasian plant. Its seeds have traditionally been used for pungent and aromatic flavourings. Although it has been grown in the Middle East and the tropics, recent interest has occurred in cultivating this crop in temperate zones. Part of the interest arises from the presence of diosgenin in the seed. Diosgenin is a naturally occurring steroid used in the manufacture of progesterone, other contraceptive steroids and corticosterone.

Fenugreek also has merit as an annual forage legume. Its seed is high in protein. Alfalfa, on the other hand, is one of the most important forage crops in North America. It has the highest feeding value for livestock of all commonly grown crops. However, some producers do not want their land allocated to one crop species for several years with a perennial crop such as alfalfa. For this reason, there is interest in alternative annual legumes, fenugreek being one.

An Alberta research team from Agriculture and Agri-Food Canada's Lethbridge Research Centre, led by Dr. Zahir Mir, is exploring the benefits of growing fenugreek in Alberta. The research project is "Evaluation of Fenugreek (*Trigonella foenum-graecum*) as an Annual Forage Legume for Beef Cattle", project 940539. The basic project objectives were to evaluate fenugreek as a feed, and to test for diosgenin levels in the new crop as well as the steroid's effects in the cattle blood.

The objectives of the research experiments were:

- To determine yield and nutritional quality of fenugreek forage at varying stages of maturity.
- To determine diosgenin content of fenugreek in the whole plant, forage and seed at varying stages of maturity.
- To compare the effect of feeding alfalfa or fenugreek silage supplemented with barley grain on growth rate, dry matter (DM) intake, feed digestibility and feed conversion efficiency.
- To determine the effects of feeding fenugreek silage-based diets on steroid hormone concentrations in the blood of feedlot steers.

Results from this study were very positive as far as potential economic gains to the province. Fenugreek grown under irrigated prairie conditions is a forage with a high DM yield and protein content and has the potential to be similar in nutritive value for cattle as alfalfa. Several types of steroidal sapogenins were detected in the seed and the forage. Results from the feeding trial indicated the nutritive value of fenugreek silage was comparable to that of full-bloom alfalfa silage for growing steers. Presence of steroidal sapogenins in fenugreek forage did not adversely affect steer performance or hormonal status. Fenugreek has potential to be a valuable forage in feedlot diets.

Fenugreek

Photo by Dr. Stan Blade

For more information, please **contact**: Dr. Z. Mir, Project Manager, Agriculture and Agri-Food Canada, Lethbridge Research Centre, PO Box 3000, Main, Lethbridge AB T1J 4B1.

Phone: (403) 327-4561
Fax: (403) 382-3156

RESULTS TO DATE

- Fenugreek found to be a nutritionally sound forage alternative to alfalfa.
- Naturally occurring steroids present in fenugreek did not affect cattle.

POTENTIAL BENEFITS

The identification of an alternate forage crop and the potential of a natural steroid could result in economic gains for Alberta's agricultural industry.

Stable Flies (cont'd)

Although it takes 2-4 weeks to show a difference (several releases required), the use of wasps is on par with the cost of pesticides, and better if there are flies with insecticide resistance. However, the combination of wasps and pesticides may be the way to go. Wasps, themselves, certainly showed good potential as biological control agents.

For more information, please **contact**:
Dr. Tim Lysyk, Project Manager, Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge AB

Phone: (403) 327-4561
Fax: (403) 382-3156

RESULTS TO DATE

New biological control for stable flies found. Good potential.

POTENTIAL BENEFITS

Possible high revenues from cattle weight gain.

Decrease Greening Rather Than Increase De-greening

Researcher discovers technology to minimize green canola seed

"Canada has a serious problem with green canola seed," says Dr. Anne Johnson-Flanagan, Associate Professor in the University of Alberta's Department of Agricultural, Food and Nutritional Science. "Green seed occurs naturally and can dramatically deteriorate the oil quality. The oil is left with a bad taste from the process of photo-oxidation."

Alberta is second in the nation for canola production. As important canola is to Alberta and Canada, it is vital to minimize or eliminate green seed. The green pigment can be removed with bleach - a costly process. Also, the clay used for bleaching cannot be re-used, and must be discarded at landfill sites.

An innovative solution was conceived. The research was conducted under ARI's **Farming for the Future Matching Grants Program,** project #95M756. Genetic engineering allowed Dr. Johnson-Flanagan to solve the problem. "The greening is produced by antisense chlorophyll a/b binding proteins (CAB). In our laboratory, we successfully removed one of the CAB genes from a *Brassica napus* canola, and placed it back in the genome, but in reverse order (thus the term antisense). The green problem was reduced. We also found a decrease in re-greening under frost conditions."

Dr. Johnson-Flanagan continues, "The technology has been proven on a laboratory scale. Our next research phase will be working with the industry, using advanced hybrids, to develop transgenic cultivars of the plant."

Green seeds are extremely undesirable in canola.

For more information, please **contact**:
Dr. Anne Johnson-Flanagan, Associate Professor, University of Alberta, Faculty of Agriculture, Forestry and Home Economics, 410 Agriculture/ Forestry Centre

Phone: (403) 492-3239
Fax: (403) 492-4265
E-mail: chair@afns.ualberta.ca

RESULTS TO DATE

Genetic engineering of canola drastically reduced the problem of seed greening in the laboratory.

POTENTIAL BENEFITS

- When available in commercial seed, improved quality of canola = higher returns for producers and reduced costs for processors.
- Potentially, many new acres could be available for growing canola, particularly in "borderline" areas of the province where climatic conditions are not ideal for a good canola crop (such as northern regions).

In the Works - Projects New and Underway

Ostrich market researched in two projects

Two projects started in the past year are examining the potential for an ostrich market in Alberta. The projects, funded under ARI's **Farming for the Future On-Farm Demonstration Program**, tackle the goal from opposite ends of the agricultural chain: production in feedlots, and consumer acceptability of ostrich meat.

Starting with the producer, "Ostrich Feedlot Project" (project #96PR06) will try to prove the viability of raising ostrich chicks (1-5 days) to meat market birds (12-18 months). Fifteen Peace region producers are cooperating on the project.

Anticipated benefits are: improved economics of ostrich production; via a feedlot, production efficiencies will be maximized; reduced shipping costs of finished birds; and (long-term), a successful feedlot operation will create a new avenue for livestock diversification not only in the Peace country, but all of Alberta, thus leading to the establishment of a viable ostrich industry.

In the other ostrich project, "Feasibility of Alternative Meats - Ostrich" (Project #95SR15), a few of the many objectives are: 1) to determine consumer acceptability of ostrich meat, and, 2) to develop consistency on ways of promoting the meat, nutritional analysis, storage life, and cooking methods. Economic benefits are expected to arise from increased recognition at the consumer level.

That Time of Year Again

Research proposals reviewed

There is no easing into the new year for the Agricultural Research Institute. January is a busy month, during which hundreds of research proposals are evaluated for scientific merit and potential benefits to the provincial economy. Proposals are grouped into six technical areas:

- Beef and dairy
- Cereals and oilseeds
- Forages, pulses, vegetables and other crops
- Pork, poultry, sheep and other livestock
- Resource conservation
- Policy, economics and marketing

Each technical area has its own committee. The committees are well-represented by producers, processors, private sector organizations, government research centres and university research scientists. In January of every year, the committees thoroughly review every application, which are then ranked on the basis of ARI priorities, then sent to the Board of Directors for final decisions.

Project approval occurs in late February/early March. Funding is either partial or 100%, depending on the program. The **Farming for the Future Matching Grants Program**, for example, funds projects usually on a 50:50 basis.

For more information, please **contact**: Patrick Marce, Communications Officer, Alberta Agriculture, Food and Rural Development, Research Division, 7000-113 Street, Edmonton AB T6H 5T6.

Phone: (403) 422-6575
Fax: (403) 427-3252
E-mail: marcep@agric.gov.ab.ca

Research Report on the Web

"Research Report" is now available on the WorldWide Web. It can be found at the following address: **http://www.agric.gov.ab.ca/ministry/agency/aari.html**

Once the AARI site is found, it can be bookmarked. This will eliminate any future need to type out the long address. Plans are to put a limited number of back issues on the WEB. Any comments, suggestions, questions about "Research Report" can be directed to the editor at the following address: marcep@agric.gov.ab.ca

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